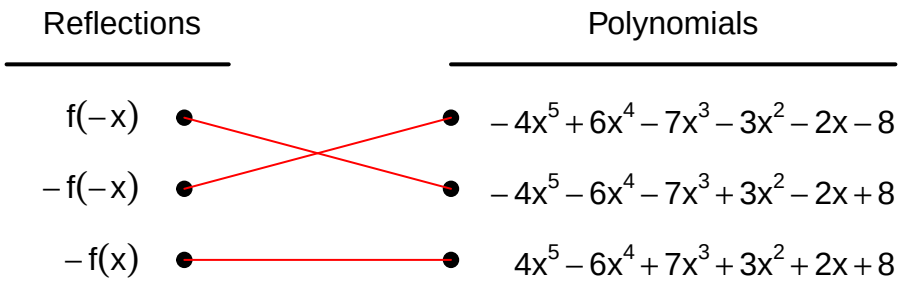
Name: Date:

Exam: Function Reflections (Solution version 41)

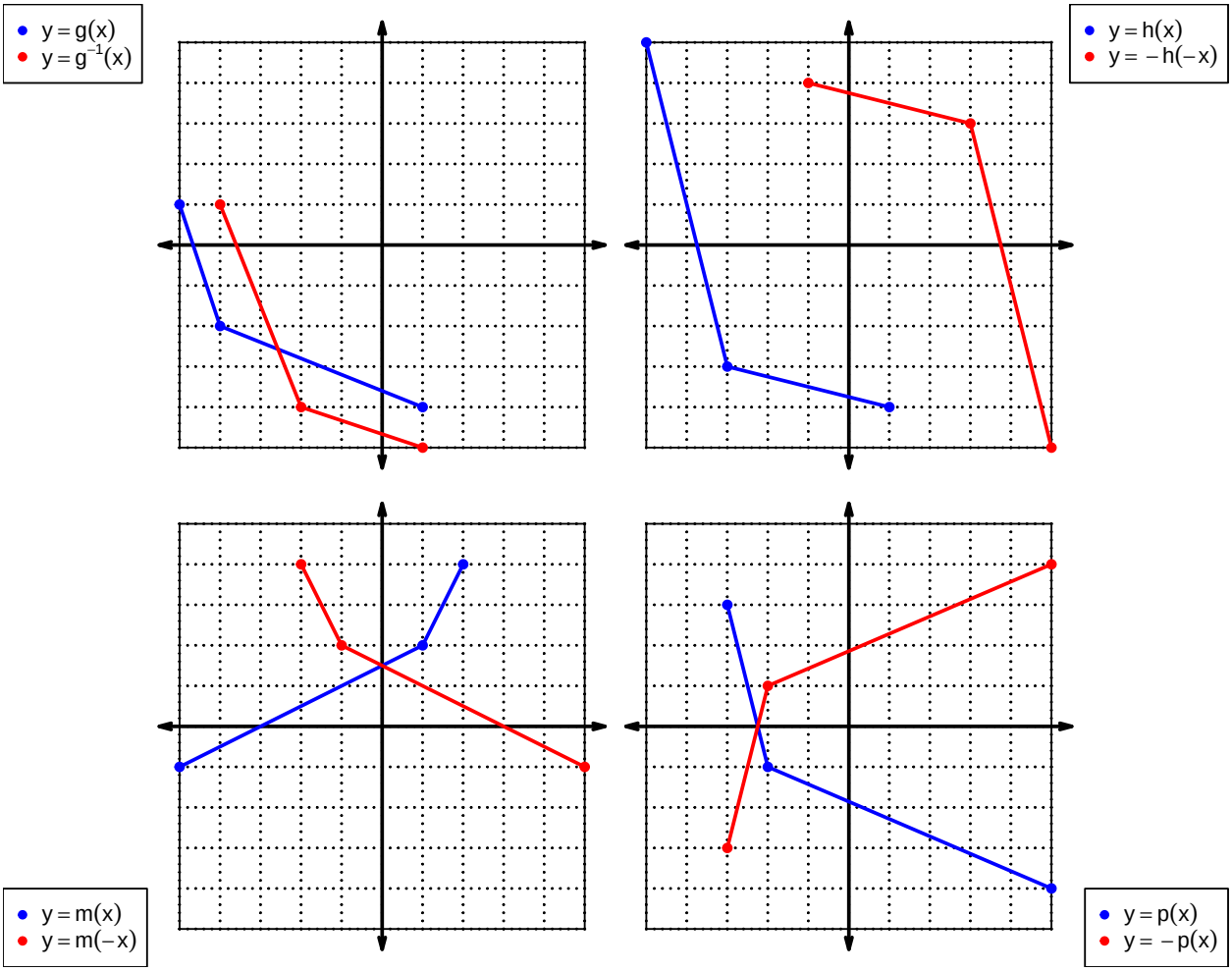
1. Let function f be defined by the polynomial below:

$$f(x) = 4x^5 + 6x^4 + 7x^3 - 3x^2 + 2x - 8$$

Draw lines that match each function reflection with its polynomial:



2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



Exam: Function Reflections (Solution version 41)

For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	3	9	4
2	4	5	7
3	7	3	8
4	6	7	3
5	8	1	5
6	9	2	1
7	1	8	6
8	2	6	9
9	5	4	2

3. Evaluate $g(1)$.

$$g(1) = 9$$

4. Evaluate $f^{-1}(4)$.

$$f^{-1}(4) = 2$$

5. By filling more rows of the table, it is possible to make function h **even**. If that were done, what would be the value of $h(-7)$?

If function h is even, then

$$h(-7) = 6$$

6. By filling more rows of the table, it is possible to make function f **odd**. If that were done, what would be the value of $f(-3)$?

If function f is odd, then

$$f(-3) = -7$$

Exam: Function Reflections (Solution version 41)

7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) = x^3 + x$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = (-x)^3 + (-x)$$
$$p(-x) = -x^3 - x$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -\left(-x^3 - x\right)$$
$$-p(-x) = x^3 + x$$

   c. Is polynomial p even, odd, or neither?

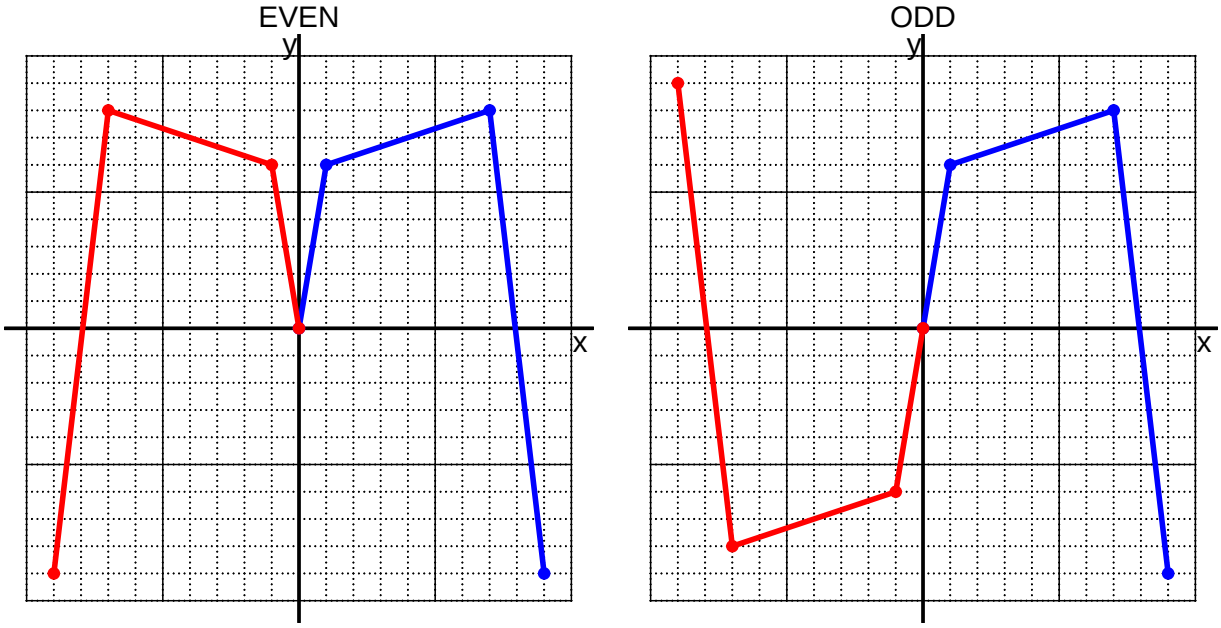
   odd

   d. Explain how you know the answer to part c.

   We see that $p(x) = -p(-x)$ for all x because $p(x)$ and $-p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an odd function.

Exam: Function Reflections (Solution version 41)

8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = 5(x-3)$$

a. Evaluate $f(19)$.

step 1: subtract 3
step 2: multiply by 5

$$f(19) = 5((19)-3)$$
$$f(19) = 80$$

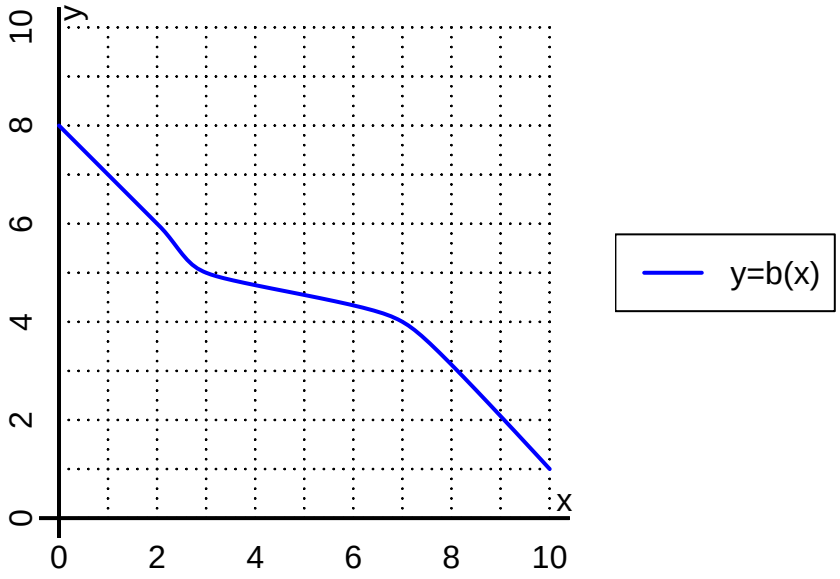
b. Evaluate $f^{-1}(45)$.

step 1: divide by 5
step 2: add 3

$$f^{-1}(x) = \frac{x}{5} + 3$$
$$f^{-1}(45) = \frac{(45)}{5} + 3$$
$$f^{-1}(45) = 12$$

Exam: Function Reflections (Solution version 41)

10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(2)$.

$b(2) = 6$

b. Evaluate $b^{-1}(5)$.

$b^{-1}(5) = 3$

Exam: Function Reflections (Solution version 41)

11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-9	9	-9	9
-1	-6	6	6	-6
0	0	0	0	0
1	6	-6	-6	6
2	-9	9	-9	9

b. Is function f even, odd, or neither?

neither

c. How do you know the answer to part b?

Function f is neither because neither column $-f(-x)$ nor column $f(-x)$ matches column $f(x)$ exactly.